THE INSTITUTE OF PHYSICS

47 BELGRAVE SQUARE, LONDON, S.W.1

BULLETIN

No. 26 *Information in this circular is not intended for general publication: your copy should not therefore be passed to a library.* FEBRUARY 1952

NOTICES TO MEMBERS

New Education Report

The Education Committee of the Board has completed the draft of a new booklet on the education of physicists. This, with the title *The Scientific Education of Physicists*, will be published by the Institute in the spring. It is intended to be a practical and authoritative guide to the facilities available in the universities and technical colleges of this country for the education and training of physicists; it is hoped that schoolmasters, boys and girls and their parents will find it particularly useful. Copies will be available to members and others in early April.

Civil Defence

The Institute has been asked by the Home Office to call the attention of Fellows, Associates and Graduates to the need for physicists in various capacities in Civil Defence. In particular, a number of physicists are now required for service as instructors in the use of scientific equipment connected with reconnaissance work. It would be an advantage if those who volunteered were prepared to enrol as members of the local Civil Defence Corps. Further details will be supplied by local headquarters of the Corps. Members who do offer their services should, of course, indicate to the local authorities any other important duties which they might have to undertake in the event of a war. Most physicists would have heavy duties arising from their normal employment or from special full-time work which they might undertake.

Physics as a Career

The manuscript of the small book *Physics as a Career* which the Deputy Secretary, Mr. N. Clarke, was invited to write, is now at press. Publication will be in the early spring. The book contains a great deal of factual information about the opportunities of different branches of the profession, but it is written from a personal point of view and Mr. Clarke gives his own comments based on his experience in advising members and students upon careers. Full details will be circulated later.

Change of dates of Scottish Branch meetings

The dates of the lectures arranged by the Scottish Branch for members only had to be changed after the January BULLETIN had gone to press. The lecture course began on January 18th (not January 11th as announced in the BULLETIN) and the dates of these meetings are all one week later than announced in the BULLETIN.

PROCEEDINGS OF THE BOARD

The Board met on November 15th and January 17th, the President, Professor W. E. Curtis, in the Chair. The following items were dealt with in addition to formal business and matters referred to elsewhere in the BULLETIN.

1952 *Budget*

The Honorary Treasurer, on behalf of the Finance Committee, submitted the 1952 Budget, which was agreed. Because of continuing rising costs of paper, printing and other expenses, the Committee had felt it prudent to budget somewhat amply for the main items of expenditure and to estimate income rather cautiously. On this basis provision was made for a total expenditure of £37,700, exclusive of £1,685 required for depreciation and for the premium (£985) of the leasehold redemption policy which has been taken out to assure a sum of £40,000 in 1982 when the lease of the Institute's house expires. An income of £39,100 was estimated. There would therefore be, on these figures, a cash deficit of £285 on the year but this would not take account of the increase in value of the Institute's stock of publications; a modest estimate of this increase in 1952 was £1,500 and the Institute would, therefore, have a "trading" surplus on the year of about £1,200. The Finance Committee was hopeful that its estimates would be proved to be slightly pessimistic and that, despite rising costs, expenditure would be less than had been budgeted.

In consultation with the Institute's accountants, the Secretary has introduced a more modern bookkeeping system which will enable greater budgetary control to be exercised throughout the year.

Publications

On the advice of the two Journal Committees authority was given for the enlargement in 1952 of the *Journal of Scientific Instruments* and the *British Journal of Applied*

Physics. This is to be achieved by a small increase in the number of pages in each annual volume and by the use of a smaller size of type, giving about 15% more words to each page.

Co-operation with the Physical Society

The President reported on informal talks which had taken place between officers of the Institute and the Physical Society with a view to increasing collaboration between the two bodies. The talks had been cordial and various proposals had been discussed. Among these was the suggestion that the meetings of each body should be announced to the members of the other; a list of Physical Society meetings is included in this BULLETIN. Another proposal which was endorsed concerned publications, an announcement of which appeared in the January BULLETIN.

Proposed Team to study American Testing Methods

The Anglo-American Council on Productivity had invited the Institute to appoint a representative to attend a meeting to discuss a proposal to send a specialist team to study American methods of testing materials. Mr. H. P. Rooksby (Fellow) attended as the representative of the Institute.

1953 *Convention*

It was agreed that another Institute Convention, along the lines of that held at Buxton in 1949, should be held in 1953. An organizing committee consisting of one representative of each home Branch and each Group is being set up under the chairmanship of the Honorary Secretary, Dr. B. P. Dudding, to arrange a three- or four-day conference of wide interest on the theme "Recent advances in physics."

Status and salaries of schoolmasters

A report from the Joint Council of Professional Scientists included a recommendation for further action to try to secure improvement of the status and salaries of science teachers in schools. It was agreed to support joint action by the bodies represented on the Joint Council (The Royal Institute of Chemistry, The Institution of Metallurgists, The Institute of Biology and The Institute of Physics).

MEMBER OF NOTE

William Somerville Vernon, M.Sc. (*Chairman, Education Group*). Born in Invercargill, New Zealand, in 1895, Mr. Vernon graduated in physics in the University of Otago. At the end of the first world war he was for some time Acting Professor of Physics in Auckland University College before beginning a tour of Canada and the United States, where he visited many universities, research institutions and industrial laboratories. From America, Mr. Vernon came to this country in 1921 on a visit then intended to be short but which is still continuing! For four years he was on the staff of the University of Manchester and was joint author of several papers on X-ray analysis of crystal structure.

In 1925 Mr. Vernon was appointed Head of the Physics Department of Cardiff Technical College and still occupies that post, having also been Vice-Principal of the College since 1950. He has always had a prime interest in experimental work and the acquisition by physicists of laboratory skills and his department is notable for the emphasis which has been placed on the design and construction of apparatus.

Mr. Vernon was elected to Associateship of the Institute in 1920, to Fellowship in 1934 and served on the Board 1946–49. He has been an Institute representative (1946–51) on the Joint Committee with the Ministry of Education for National Certificates in Applied Physics and still is a member of the Education Committee and the Membership Committee. When the Education Group was formed, he was asked to become its first Chairman.

Mr. Vernon is also Chairman of the South Wales Branch of the Society of Instrument Technology and a member of the Council of that Society.

The errors of some minds in scientific investigation are more fruitful than the truths of others.
CARDINAL NEWMAN.

PHYSICAL SOCIETY MEETINGS

Members of all grades of the Institute are invited to attend the following meetings of the Physical Society or its Groups. As a matter of courtesy, notification of intention to attend should be sent in advance to the Secretary-Editor, Physical Society, 1 Lowther Gardens, Prince Consort Road, S.W.7, to whom also should be addressed enquiries concerning meetings of which full details are not given below.

Date and Time	*Subject*	*Lecturer or Organizer*	*Place of Meeting*	*Society or Group*
Jan. 31st 2.30 p.m.	Eye Movements Thin films Infra-red absorption	Prof. R. W. Ditchburn	Imperial College, London	Optical Group
Feb. 1st 2.30 p.m.	The Nuclear Research Programme at University College, London	Prof. H. S. W. Massey	Main Theatre, University College, London	Society
Feb. 7th 5.15 p.m.	Probe Microphones	Mr. R. B. Archbold	Imperial College, London	Acoustics Group
Feb. 13th 3.30 p.m.	Colour Preferences	Dr. G. W. Granger	Institute of Ophthalmology, London	Colour Group
Feb. 28th 5.15 p.m.	Speech Studies	Mr. C. M. Harris	National Hospital, Queen's Square, London	Acoustics Group
Mar. 6th 5 p.m.	National Institute for Ultrasonics in Rome	Prof. A. Giacomini	London	Acoustics Group
Mar. 12th 5 p.m.	Guthrie Lecture	Sir Lawrence Bragg	Royal Institution, London	Society
Mar. 20th 2.30 p.m.	Diffraction Fringe Contrast Microscopy Diffraction Images in Refracting Telescopes	Dr. R. Barer Dr. E. H. Linfoot	Imperial College, London	Optical Group
Mar. 24th and 25th	Surface Markings on Metals	Prof. N. F. Mott	H. H. Wills Physical Laboratory, Bristol University	Society Spring Meeting
Mar. 26th 3.30 p.m.	Visual Assessment of Colour Photography	Mr. R. G. Horner and Mr. R. W. G. Hunt	Royal Photographic Society, London	Colour Group
Mar. 27th	Absorption	Mr. H. Humphreys	London	Acoustics Group
Apr. 4th 6.45 p.m.	Exhibition Discourse: Aerodynamics	Mr. B. N. Wallis	Imperial College, London	Society
Apr. 7th 6.45 p.m.	Exhibition Discourse: Physical Basis of Colour Photography	Mr. E. R. Davies	Imperial College, London	Society
Apr. 24th 5.30 p.m.	Effect of Low Temperatures on Biological Systems	Dr. J. C. Fidler	London	Low Temperature Group
Apr. 24th	Review of German Acoustic Work	Prof. E. Meyer	London	Acoustics Group
May 2nd and 3rd all day	X-ray Analysis	Prof. J. D. Bernal	Birkbeck College	In co-operation with The Institute of Physics X-ray Analysis Group
May 8th	Phase-contrast Image of an Isolated Continuous Irregularity. The Aberrations of Space Imagery	Dr. H. H. Hopkins and Mr. C. G. Wynne	Imperial College, London	Optical Group
May 14th 3.30 p.m.	Discussion on Visual Problems on Colour Television	Various firms and organizations interested in television	Imperial College	Colour Group
May 20th 5 p.m.	Presidential Address	Prof. L. F. Bates	Royal Institution, London	Society
May 27th 5 p.m.	Holweck Lecture		Royal Institution, London	Society

NOTES ON 20TH ANNIVERSARY MEETING OF THE AMERICAN INSTITUTE OF PHYSICS

October 23–27, 1951

Statistics from the U.S.A. are usually impressive and this was certainly so for the meeting in Chicago held to celebrate the 20th anniversary of the American Institute of Physics. The centre-piece (it was held in the middle of the period of the celebrations) was a Symposium in which six papers on the present state of physics were delivered in the Chicago Civic Opera House, in one day, by eminent men of science. The speakers all had an audience of about 3 000. In the evening of the same day there was a banquet, at which over 1 000 people were present. There were speeches, and it was clear from these and especially from that by Senator McMahon that physics and physicists have some good friends in the Senate. The total number of papers presented during the meeting was very nearly 400. Of these one-half were in the proceedings of the American Physical Society. On first reading the titles of papers one might suspect a preponderance of nuclear physics but only 60 or 70 were on that subject and these were matched in number by those within the province of the Optical Society of America, while the other societies, namely the Acoustical Society of America, the Society of Rheology, the American Association of Physics Teachers and the American Crystallographic Association had papers in numbers similar in order of magnitude, though smaller.

Numbers such as these are not surprising when one considers that the American Institute of Physics and its constituent Societies have about 15 000 members. The functions of the American Institute are mainly those of co-ordinating the activities of the various societies interested in physics, mainly by control of the journals, and are therefore different from those of our own Institute. If we take the membership of the two Institutes at face value this indicates a rather greater ratio of physicists to total population in the U.S.A. than in Great Britain. Even so, more are said to be necessary.

Anyone desiring detailed knowledge of the papers read at the meeting must be referred to the issue of *Physics Today* for October 1951, and bulletins and programmes issued by the various societies. On one particular afternoon all the societies but one were running simultaneous meetings. Thus it is physically impossible to hear all the papers even if it were physiologically possible. For one with varied interests the situation is much relieved by the custom of wandering in and out of meetings at any time. The mobile section of the audience might reach around one-fifth (of an audience usually amounting to about 200) in the very brief interval between papers and a total of possibly one-twentieth during the actual reading of a paper. On the whole the custom seems preferable to the furtive escape sometimes noticed at British meetings. Most of the papers were actually read, and there is some excuse for this. For one thing the speakers are usually strictly limited to time, usually 10 minutes for contributed papers, and a warning is given when time is nearly up. Moreover it certainly raises the standard of presentation among speakers without much practice or skill in speaking. It does, however, lead to some monotony. The variations in speed, loudness and emphasis characteristic of impromptu (even prepared impromptu!) presentation do lend some colour. It may be that the uniformity resulting from the reading of papers is the reason why a little humour in the presentation of a paper appeared to be much appreciated.

American science is much the same as any other science, but up to now the emphasis seems to have been towards technological aspects. To take a phrase used in another connection by one of the speakers, this may be a relic from the frontier days when it was more important to do things than to talk about them. But some people are now pressing hard for more fundamental research. It may be noteworthy that one speaker, in the subject of optics, remarked that the fundamental advances appeared to come from Europe. A speaker on the subject of what is required of an applied research physicist by an employer mentioned as desirable those qualities, genius apart, which are, in fact, required for fundamental research. He also complained of too much text-book knowledge in comparison with knowledge of "ways and means." All his remarks could well be made in this country. It is an interesting speculation, with America moving towards more fundamental research and with us moving more towards technology, whether we shall not both come to about the right balance at about the same time.

An exhibition of scientific instruments and books was held in connection with the meeting. This was quite small but otherwise not different in character from that held annually by the Physical Society. There were 62 stands and provided one's interests were not all-embracing a couple of hours was sufficient to see the exhibition. Instruments from a firm in England and one in Italy were on show by distributors.

Everyone was labelled with a badge on the lapel. If one's eyesight is reasonably good this is very helpful in remembering the name of a man to whom one has recently been introduced. It is a custom which might well be adopted more often in England than it is.

I cannot conclude these notes without remarking, as everyone who visits the U.S.A. does, on the hospitality and helpfulness the visitor receives.

E. W. H. SELWYN

NEW BOOKS

The Autobiography of Robert A. Millikan. By R. A. MILLIKAN. (London: Macdonald and Co. Ltd.) Pp. xvii + 334. Price 21*s*.

This book gives a pleasant, entertaining and eminently readable account of Millikan's life and of his contributions to fundamental physics. But it also does a good deal more. It shows the remarkable development, from small beginnings, which has taken place during his lifetime in scientific research and its applications in the United States. In shaping this he has taken an active part. We are given a vivid picture of their machinery of university government, and of the development of the California Institute of Technology and of the National Research Council.

Although Millikan had a number of opportunities of becoming a leading university administrator he preferred to retain his active connection with teaching and research. His clear-sighted and thoroughly sensible views on education are refreshing. He expresses the sense of duty which science must have to the whole community, the need for maintaining university freedom, and the need for close collaboration between industry and applied science. We can learn much from his account of the undoubted success of technological education in America and of the sense of vitality that it has inspired in industry.

His clear-sighted outlook extends to international affairs and he shows the need for peace-loving peoples to stand firmly together to resist aggression. Many generous and friendly references are made to the ideals and achievements of this country.

Millikan deals finally with his philosophy of life. On this I cannot do better than quote from the foreword by Sir George Thomson: "The great value of the book is as a record of the philosophy, the very human philosophy, of a man of singular sympathy and clearness of vision, who has been concerned with these ideas throughout a long life."

T. L. IBBS.

Psychology, Religion and Healing. By LESLIE D. WEATHERHEAD. (London: Hodder and Stoughton Ltd.) Pp. xxv + 544. Price 25*s*.

Dr. Leslie Weatherhead, Minister of the City Temple, is well known as a psychological healer. He here examines the whole basis of therapeutic psychology with his many years' experience to guide him. His standpoint is, of course, that of a religious man and his book emphasizes the importance of the religious element in the treatment of sickness. As Mr. Geoffrey Evans says in the foreword: "He (the author) has given us doctors a generous and dispassionate account of various methods of healing through religious influences."

After a quick survey of non-physical healing from earliest times the author proceeds to examine the miracles of Jesus in the light of modern psychology and concludes that they "cannot be regarded merely as therapeutic treatments." "Psychological theories can illumine but cannot explain Christ's healing work"—it derives from His divinity. Turning to healing in the early Church Dr. Weatherhead laments the passing of the healing ministry but notes, with satisfaction, that individuals have carried it on unbroken to the present day. He reviews the modern methods of healing through religion, including the laying-on of hands and the practice of intercession. He is soberly critical of Lourdes and of Christian Science and exposes their weaknesses, but his own experiences as well as the recorded evidence of others assure him that "the spiritual world has immense therapeutic energies which are scarcely tapped in this modern age of reliance upon pure science and organic therapy." It is interesting to note that nearly every branch of the Christian Church to-day has within or associated with it a healing movement, and most of these have the co-operation of medical men.

The author then summarizes the outlook and methods of Freud, Adler, Jung, McDougall and others, shows how all of them have something to contribute to modern psychotherapy and proceeds to discuss the question "do modern psychological methods of healing need religion?" He examines guilt, deprivation of love and other emotional states as causative of illness and concludes that religion may often be supremely important in the prevention and cure of some diseases. He is careful not to claim too much, he constantly emphasizes the important place of modern medicine and modern surgery, but nevertheless leaves the reader in no doubt that "religion is not a kind of remedy to apply when drugs and poultices, surgery and injections have failed." For him religion is neither an illusion nor a neurosis.

Readers who do not share his vigorous Christian faith will still have to weigh with scientific detachment the evidence he sets forth. It is sometimes startling, always suggestive of wider realms of experience and often concerned with phenomena about which little at present are known. It is obvious that in the past clergy and priests have often been practising psychologists, using simple techniques to which we apply the jargon of our present age without necessarily understanding them the better. In the future not only will ministers of religion be better trained in psychology but, if the author's practice and advice are followed, we shall have associated with every group of churches a psychological clinic where doctors and ministers will co-operate. This book indicates the problems they will tackle together. In so doing it gives a well-balanced account of a wide and interesting field overlapping parts of medicine, psychology and religion, where phenomena are complex and thus often variously interpreted.

J. TOPPING.

Space Medicine. Edited by JOHN P. MARBARGER. (University of Illinois Press.) Pp. 83. Price $3.00.

This lavishly produced little book contains the papers presented at a symposium in Chicago in 1950. Apparently, space medicine is concerned with the physiological problems likely to be encountered in flights into and in space. After an excellent short account by W. von Braun of the physical problems and possibilities of multi-stage rockets and artificial satellites, are four papers on subjects such as the possibility of extra-terrestrial life, orientation in space, and space bioclimatology—the science of the effects on man of the extraordinary climates.

I found P. A. Campbell's account of the relative roles of visual, vestibular and kinesthetic stimuli in determining orientation quite fascinating. His suggestion that an artificial gravity may be provided by magnets acting on underwear containing suitably placed woven-in strands of magnetic material would also seem to offer attractive possibilities!

The book may be aptly described as a cocktail; it is a highly decorative concoction of interesting ingredients designed to whet the appetite. Problems and possibilities are mentioned or suggested but are not discussed in detail. The reader will either be stimulated to pursue the subject further or will dismiss the whole thing as fantastic.

A. E. DE BARR.

NEWS OF MEMBERS

The New Year Honours List announced the following awards to Members:—

O.B.E.

Fellows—J. Guild, Col. F. R. W. Hunt, W. H. Reynolds.

M.B.E.

Associate—A. J. Garratt.

Fellows

Sir Andrew McCance has been elected President of the Institution of Engineers and Shipbuilders in Scotland.

The following professional appointments have been notified:—

A. E. Bate, Head of the Department of Physics, West Ham Municipal College.

E. H. Jones, Principal Research Officer, British Cotton Industry Research Association, Manchester.

Associates

The following professional appointments have been notified:—

A. F. Brown, Lecturer in Natural Philosophy, University of Edinburgh.

L. G. Chambers, Lecturer in Mathematics, Military College of Science, Shrivenham.

C. H. Foreshaw, United Ebonite and Lorival Ltd., Little Lever, Bolton.

W. H. Gibbons, Chief Research Engineer, Radio Valve Department, Ferranti Ltd., Manchester.

W. Guy, Physicist, Bradford Dyers' Association Ltd., Bradford.

L. W. Magson, Lecturer in Physics, Municipal College, Burnley.

J. H. Martin, Senior Physicist, Peter MacCallum Clinic, Melbourne, Australia.

J. F. Matthews, Manager, Engineering Department, M. T. Stevens and Sons Co., North Andover, Massachusetts, U.S.A.

M. Michaelis, Consultant, Arthur D. Little Inc., Cambridge, Massachusetts, U.S.A.

P. A. Moran, Professor of Statistics, Australian National University, Canberra, Australia.

D. C. Phillips, National Research Council, Ottawa, Canada.

E. Rule, Pametrada Research Station, Wallsend-on-Tyne, Northumberland.

K. Sykes, Experimental Officer, Telecommunications Research Establishment, Great Malvern, Worcestershire.

J. S. Thorp, Services Electronics Research Laboratory, Baldock, Herts.

J. G. Walford, Research Physicist, Research and Engineering Department, S. Smith and Sons (England) Ltd., Bishops Cleeve, Cheltenham, Gloucestershire.

Graduates

The following professional appointments have been notified:—

J. Dutton, Demonstrator, Department of Physics, University College of Swansea.

I. Jones, Physicist, Process Development Section, British Nylon Spinners Ltd., Pontypool, Monmouthshire.

A. A. Webb, Assistant Experimental Officer, Admiralty Research Laboratory, Teddington, Middlesex.

THE REGISTER

ELECTIONS TO MEMBERSHIP

An asterisk (*) indicates transfer from another grade.

Fellows

Chalmers, John Alan, B.A., B.Sc., Ph.D., Senior Lecturer in Physics, University of Durham.

*Dawes, John Geoffrey, B.Sc., Principal Scientific Officer, Safety in Mines Research Establishment, Sheffield.

*Henson, Alec Frank, M.Sc., Physicist, Imperial Chemical Industries Ltd., Welwyn.

*Huntley, Herbert Edwin, B.Sc., Ph.D., Professor of Physics, University College of the Gold Coast, Achimota.

*Nemet, Anthony, Dr.Ing., Director, Philips Balham Works Ltd., London.

*Payne, Bryan Oliver, M.Sc., Optical Designer, Cooke Troughton and Simms Ltd., York.

*Peirson, Douglas Henry, B.Sc., Senior Scientific Officer, Atomic Energy Research Establishment, Harwell.

Seshadri, T. N., M.A., Physics and Soil Mechanics Officer, Government of Madras, Madras.

*Stewart, Alexander, B.Sc., Division Instrument Engineer, Imperial Chemical Industries Ltd., Glasgow.

Associates

*Barker, Audrey Nicholson, B.Sc., Ph.D., Lecturer in Surgery, University of Edinburgh.

*Bluhm, Max Michael, B.Sc., D.I.C., Ph.D., Assistant Lecturer, Imperial College, London.

Bukhari, Mohd Sultan, M.Sc., Senior Scientific Officer, Department of Controller of Inspection and Technical Development, Pakistan.

Chick, Douglas Richard, M.Sc., Joint Section Leader, Associated Electrical Industries Ltd., Research Laboratories, Aldermaston.

Chippindale, Peter, B.Sc., Ph.D., Research Physicist, Tootal Broadhurst Lee Co. Ltd., Manchester.

Fair, Donald Robert Russell, B.Sc., Assistant Manager, Health Physics Department, Ministry of Supply, Cumberland.

Gooding, Ernest John, B.Sc., Ph.D., Superintendent, Rockware Glass Co., Ltd., Greenford.

Hammerton, James Cecil, M.A., Senior Research Engineer, Mullard Research Laboratories, Redhill.

Hardy, Rowland, M.Sc., Chief Development Engineer, Electroflo Meters Co., Ltd., London.

Hawkins, Arthur Ernest, B.Sc., A.R.C.S., Lecturer in Physics, Battersea Polytechnic, London.

*Horn, George Morison, B.Sc., Engineer, Electric and Musical Industries Ltd., Hayes, Middlesex.

Lewis, Hilary Clayton, B.Sc., A.R.C.S., D.I.C., Ph.D., Senior Mathematics Master, St. Benedict's School, Ealing.

McGuire, John Howard, B.Sc., Senior Scientific Officer, Fire Research Station, London.

Mehta, Gopalsingh Kishansingh, B.Sc., Research Assistant, Institute of Science, Bombay.

*Scott, Roberta, B.Sc., Research Officer, Commonwealth Scientific and Industrial Research Organization, Sydney.

*Settle, Robert Nicholl, B.Sc., Physicist, Henry Simon Ltd., Cheadle Heath, Cheshire.

*Sharman, Roy Victor, B.Sc., Assistant Lecturer, Acton Technical College.

Sims, Raymond Bernard, B.Sc., Senior Investigator, British Iron and Steel Research Association, Sheffield.

Skinner, Charles Edwin, B.Sc., Assistant, County Technical College, Worksop.

Smith, Colin Henry, M.Sc., Research Physicist, Westinghouse Brake and Signal Co. Ltd., London.

Squire, Donald Hugh, B.Sc., Head of Research and Development Department, Elastic Yarns and Fine Wires Ltd., Nottingham.

Stadler, Hans Peter, B.Sc., Ph.D., Lecturer in Physical Chemistry, King's College, Newcastle-upon-Tyne.

*Watkins, John, B.Sc., Scientific Staff, General Electric Co., Ltd., Wembley.

*Webb, Donald Percy Dennis, B.Sc., A.R.C.S., D.I.C., Ph.D., Research Assistant, Imperial College, London.

Wright, Raymond William Henry, B.Sc., Ph.D., Lecturer in Physics, University College, Ibadan, Nigeria.

Graduates

*Avis, Montague Clement, B.Sc., Research Student, University College, London.

*Bancroft, Alfred Malcolm, M.Sc., International Staff, Schlumberger Group of Companies.

*Beck, Alan Edward, B.Sc., Assistant Physicist, British Oxygen Co. Ltd., London.

Badzioch, Stanislaw, B.Sc., Scientific Officer, British Coal Utilisation Research Association, London.
Bell, Eric Brayton, B.Sc., Scientific Officer, British Iron and Steel Research Association, London.
Birch, Roy Gerald, B.Sc., Physicist, General Electric Co. Ltd., Stanmore.
Burnside, William, B.Sc., Physicist, Babcock and Wilcox Ltd., Renfrew.
*Caldwell, John Henry, B.Sc., Technical Officer (Radar), Royal Australian Air Force.
Champion, John Anthony, B.Sc., Experimental Staff, General Electric Co. Ltd., Wembley.
Clark, William Lockhart, M.A., B.Sc., Principal Science Master, Wishaw High Secondary School.
*Conn, Gerald David, B.Sc., Education Officer, Royal Air Force.
Cross, Sydney Harold, Research Assistant, W. Edwards and Co. Ltd., London.
Dennis, Nigel Thomas Metcalf, B.Sc., Research Physicist, W. Edwards and Co. Ltd., London.
*Doram, Colin Carrington, B.Sc., Student, University College, Hull.
Evans, David Walter, B.Sc., Project Engineer, E. K. Cole Ltd., Malmesbury.
Evans, John Ifor, B.Sc., Technical Officer (Physicist), Imperial Chemical Industries Ltd.
Eyres, John Sturges, B.A., Experimental Assistant, General Electric Co. Ltd.
Frost, Henry George, B.Sc., Research Student, Sir John Cass College, London.
Goldby, David Lyster, B.Sc., Assistant Experimental Officer, Armament Research Establishment, Woolwich.
*Granville, Raymond Arthur, B.Sc., Scientific Officer, British Iron and Steel Research Association, London.
*Gunn, Morris William, B.Sc., Engineer, Postmaster General's Department.
*Gunn, Vera Patricia, B.Sc., Physics Demonstrator, University of Queensland.
Hall, Raymond Frederick, B.Sc., Research Physicist, British Scientific Instrument Research Association, Chislehurst.
Harris, Richard David, B.Sc., Senior Physics Master, Ardingly College, Sussex.
Hatch, Donald, Physicist, Ferodo Ltd., Chapel-en-le-Frith.
*Healey, Ernest Michael, B.Sc., Scientific Officer, Royal Aircraft Establishment, Farnborough.
Hiorns, Frederick John, B.Sc., Scientific Officer, British Coal Utilisation Research Association, Leatherhead.
*James, David Benjamin Garfield, B.Sc., Assistant in Physics, Swansea Technical College.
*Jarman, Robert Tudor, M.Sc., Weather Forecaster, Bermuda Government.
McDonald, Brian James, B.Sc., Scientific Officer, Chemical Inspectorate, Ministry of Supply.
Mackey, Patrick, M.Sc., Research Physicist, National Smelting Co., Avonmouth.
Marr, Geoffrey Vickers, B.Sc., Student, Reading University.
Marshall, Neil, M.A., Research Officer, British Coal Utilisation Research Association, Leatherhead.
Masterman, John Raymond, B.Sc., Senior Physics Master Deacon's School, Peterborough.
*Moat, Alan, B.Sc., Scientific Officer, Ministry of Supply.
Moody, Eric St. George, B.Sc., Technical Officer, Aeronautical Research Laboratory, Victoria.
Nichols, Kenneth Graham, B.Sc., Assistant Lecturer, West Ham Municipal College.
*O'Donnell, Patrick Joseph Dollard, B.Sc., Technical Officer, Imperial Chemical Industries Ltd., Stevenston.
Pask, Thomas Arthur, B.Sc., Research Physicist, Courtaulds Ltd.
*Pothecary, Ivan John William, B.Sc., Scientific Officer, Meteorological Office, Air Ministry.
*Short, Amon Mann, B.Sc., Research Student, Birkbeck College, London.
*Smith, Terence George, B.Sc., Physicist, Kodak Ltd., Harrow.
Sykes, Reginald, Assistant Physicist, Dunlop Rubber Co. Ltd.
Taylor, Brian Raine, M.A., Scientific Staff, Elliott Brothers (London) Ltd., Elstree.
Turner, Gerald L'Estrange, B.Sc., Experimental Staff, General Electric Co. Ltd., Wembley.
*Watts, James Wilfred, B.Sc., Scientific Officer, Air Ministry.
Wolstenhulme, John Milton, M.A., Research Physicist, Wiggins, Teap and Co. Ltd., High Wycombe.
*Zukowski, Richard Joseph, B.Sc., Research Physicist, Duplate Canada Ltd.

Subscribers

Britton, Peter Lawrence, Technician, Sir W. G. Armstrong Whitworth Aircraft Limited.
Manton, Irene, Professor of Botany, Leeds University.
Nelson, James Bowman, British Coal Utilisation Research Association.
Pitt, Geoffrey John, Research Assistant, University of Oxford.
Shephard, T. John, Industrial Radiographer, Ilford Limited.
Woutman, Frederick, Research Chemist, Analytical Research Institute, Holland.

Students

Allan, G. W., University of Durham.
Belton, A., The Polytechnic, Regent Street, London.
Bull, D. C., South East London Technical College, Lewisham.
Carpenter, B. L., Acton Technical College.
Childs, M., Glamorgan Technical College, Treforest.
Davies, G. J., University College of Swansea.
Edmonds, P. D., Imperial College of Science and Technology, London.
Edwards, R. J., Northern Polytechnic, London.
Evans, H. J., University of Dublin.
Farraday, D. J., University College of Swansea.
Heasell, E. L., Imperial College of Science and Technology, London.
Hill, D. W., Borough Polytechnic, London.
Horner, R. A., University of Durham.
Horsfall, J. P., University of Manchester.
Jones, D. R. L., University of Wales.
Millar, J. C., Royal Technical College, Glasgow.
Patton, R. G., College of Technology, Birmingham.
Plant, T., College of Technology, Birmingham.
Sawtell, R. E., University of London, King's College.
Sheldon, E. B., Acton Technical College.
Simmonds, D. A., College of Technology, Liverpool.
Thorburn, R., University of Glasgow.
Tidman, D. A., Imperial College of Science and Technology, London.
Truelove, A. H., University of Cambridge.
Wadsworth, A. J., University of Durham.
Watkins, T. L., Borough Polytechnic, London.
Whitehurst, G. W., Royal Technical College, Salford.
Wilson, D. J., School of Science, Oxford.
Woolgar, R. C., Woolwich Polytechnic.
Worboys, A. F., Northern Polytechnic, London.

APPOINTMENTS VACANT

The inclusion of particulars of a vacancy must not be taken to imply that the Institute necessarily approves of the terms offered or that might be offered. Candidates should satisfy themselves that these are satisfactory, and they may always refer to the Institute for advice.

Ferranti Limited, Edinburgh, have staff vacancies for engineers or physicists to work on the development of special valves to operate at microwave frequencies. Experience in this type of work is not essential, but applicants should have an honours degree in physics or engineering.

(1) **Senior Engineers,** with experience in charge of a development group, salary range according to qualifications and experience £1 000–£1 600 per annum.

(2) **Development Engineers,** salary £500 upwards per annum according to qualifications and any previous responsibility in development work.

These positions carry good prospects for advancement in an expanding organization. Contributory Pension Scheme. Apply quoting "VPL/E," giving full details of training, qualifications and experience to the Personnel Officer, Ferranti Limited, Ferry Road, Edinburgh.

Physicist or **Mechanical Engineer** required by the **British Iron and Steel Research Association** to lead a small research team in the Association's laboratories in Sheffield. Honours degree in physics or mechanical engineering essential. Some research experience desirable but not essential. Salary in the range £600 to £740 per annum according to age, qualifications and experience. Post is superannuated under the F.S.S.U. Written applications only to the Personnel Officer, B.I.S.R.A., 11 Park Lane, London, W.1.

Physicist required by the **British Iron and Steel Research Association** for research on methods of measurement and control of metallurgical furnaces. Applicants should be between 21 and 25 years of age, should have a university degree in physics or equivalent qualification, and an interest in experimental work on plant in actual operation. Location of work—Sheffield. Salary will be according to qualifications and experience, with superannuation benefits under the F.S.S.U. Written applications only to Personnel Officer, B.I.S.R.A., 11 Park Lane, London, W.1.

The **British Aluminium Company** have a vacancy for **Process Assistant** at their Reduction Works in Scotland. Candidates should be aged 23–26 with technical degree and have completed National Service or be exempt. Permanent, pension scheme, salary according to qualifications and experience. Applications to Director in Charge of Establishment, B.A. Company, Norfolk House, St. James's Square, London, S.W.1.

Electronic Engineers required for Research Laboratory, **Associated Electrical Industries Limited,** Aldermaston Court, Berks. Applicants should have had sufficient research experience to design electronic equipment for physicists engaged on fundamental research. Send full details of qualifications, experience and salary required to the Director.

A vacancy exists for a **Mechanical Design Engineer** possessing a university degree in physics or mechanical engineering with, preferably, some years' experience in the design of precise and intricate mechanisms. The post requires a good knowledge of scientific principles applied to mechanisms and calls for originality and initiative. Salary £650 per annum upwards. Apply in writing to the Personnel Officer, **Electronic Tubes Limited,** Kingsmead Works, High Wycombe, Bucks.

Applications are invited by the **Ministry of Supply** for the following Scientific Officer class posts in the Radio Department of the Royal Aircraft Establishment, Farnborough. **Senior Scientific Officer** to work on research and development of airborne and ground radio-navigation equipment and the supervision of relevant development contracts with industry. Candidates should be experienced in the development of radio-navigational aids and have some knowledge of the planning and supervision of tests and evaluation trials of completed systems. Ref. A394/51A. **Scientific Officer** for experimental work on new techniques and systems for communications, navigation, and radio control, using very high frequencies. Ref. A395/51A. **Scientific Officer** for research on electro-acoustic problems occurring in aviation, including voice transmission in the presence of high noise levels, and measurement and assessment of microphone and telephone performance. Ref. A396/51A.

Candidates should have a 1st- or 2nd-class honours degree in physics or electrical engineering, or equivalent qualification. For the senior grade candidates should be at least 26 years of age with at least 3 years' post-graduate research experience. Salaries will be assessed according to age, qualifications and experience within the ranges Senior Scientific Officer—£720–£910, Scientific Officer—£380–£620. Rates for women somewhat lower. Posts are unestablished but carry benefits under F.S.S.U. Application forms obtainable from Technical and Scientific Register (K), Almack House, 26 King Street, London, S.W.1, quoting appropriate reference number. Closing date 25 February, 1952.

Imperial Chemical Industries Limited, Dyestuffs Division, has vacancies for a number of **Physicists** in the Research Department at Blackley, Manchester. Duties involve the application of modern physical techniques to problems arising in the organic chemical industry. Although the range of physical problems referred to is very large, there are opportunities for suitable men to specialize. Men under 30 years of age with a good honours degree in physics who are interested should write to Staff Department, Hexagon House, Blackley, Manchester, 9. Salaries according to qualifications and experience.

Vacancies exist for several **Graduate Physicists** or **Electrical Engineers** for work in connexion with electrical and electronic instruments and for extended research programme on thermionic emission. Some knowledge of vacuum physics would be an advantage for the latter post but, otherwise, experience is not essential. Applications will be considered for ages between 20–30 with salaries dependent upon qualifications and experience. Applications to **British Scientific Instrument Research Association,** Southill, Chislehurst, Kent.

Vacancies exist at the **Dunlop Research Centre,** Birmingham, for **physicists** with a good honours or higher degree to carry out fundamental research on textiles. Previous textile experience not essential. Applications in writing quoting DNO/16 and giving details of age, qualifications and experience to the Personnel Manager, Dunlop Rubber Co. Ltd., Fort Dunlop, Erdington, Birmingham, 24.

Engineers and **Physicists** are required by the **Electrical Research Association** for investigations on:—

1. Novel sources of electrical energy (experience needed in instrumentation or automatic control).
2. Principles of the solid state as applied to dielectrics.
3. Gaseous ignition.
4. High frequency communications.
5. Research on light-current and power components.

Starting salaries will be in the range £500–£750 per annum, but in certain instances higher starting salaries will be considered and there are also more junior positions with starting salaries in the range £400–£500 per annum. Subject to a probationary period, F.S.S.U. applies to members where eligible or an equivalent scheme if not eligible under F.S.S.U. rules. Application should be made to the Director, Electrical Research Association, Wadsworth Road, Perivale, Greenford, Middlesex.

Applications are invited by the **Ministry of Supply** for vacancies in the **Experimental Officer** class at the Atomic Energy Research Establishment, Harwell, Berks, for work in the following fields:—

Physics, electronics and scientific computing. Ref. A309/51A; and chemistry (other than organic chemistry), chemical engineering and metallurgy. Ref. F777/51A.

These posts offer a wide variety of experimental work in connexion with the development of atomic energy and the opportunity for a career in an increasingly important branch of science. Candidates should possess at least Higher School Certificate or Higher National Certificate in a relevant scientific subject or mathematics, or equivalent qualifications. Higher qualifications will be an advantage. Appointments will be made according to qualifications, experience and age within the following salary ranges:—

Experimental Officer (male) £454–£695 per annum.
Assistant Experimental Officer (male) £240 (at age 18)–£505 per annum.
Rates for women somewhat lower.

Application forms obtainable from Ministry of Labour and National Service, Technical and Scientific Register (K), Almack House, 26 King Street, London, S.W.1. Closing date 24 February, 1952.

Imperial Chemical Industries Limited, Nobel Division, has vacancies for **Physicists** with good honours degrees and preferably with research experience. Salary according to age and qualifications. Applications should be made to the Staff Manager, Nobel House, 25 Bothwell Street, Glasgow, C.2.

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